

Statistics in a Health Department

Medical Care Plan

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THE FUNCTION of statistics in the sense of analysis of collected data and the methodology for data collection will be discussed in this paper in relation to three phases of medical care administration: (a) formulation of the initial medical care plan and its close guidance during early operation and subsequent development; (b) determination of patterns of utilization of services, including statistics on failure to use, as well as injudicious use of medical care benefits; and (c) determination of quality of medical care. Medical care statistics as indexes for planning and administration have been stressed elsewhere (1).

Health Departments and Medical Care

Due to the success of health departments and medical research in communicable disease control and as a result of the recent marked declines in infant and tuberculosis mortality, prevention and control of disease among the indigent through provision of early and comprehensive medical care has become increasingly a responsibility of the local health department. Consistent with this trend, the Association of State and Territorial Health Officers in 1950 officially requested that administration of public medical care programs be placed under the official health

agency (2). Thus by 1950, Terris and Kramer (3) report, "62 or 5 percent of all full-time health departments have responsibilities for administering general medical services of varied scope and character."

The medical services most commonly provided are those of the physician in the home, clinic, or office and the provision of drugs and laboratory services. The geographic coverage of these health department administered programs varies from Maryland's state-wide plan for relief clients and medically indigent persons to programs covering small counties and cities of approximately 25,000 population.

The medical care programs in Maryland represent the result of intensive investigations by the Committee on Medical Care of the State Planning Commission during the period 1940-46. Following separate studies of the medical needs and resources of the counties of Maryland and of Baltimore City, two distinct and administratively independent programs were established. Both county and city programs are concerned with indigent persons and are founded upon the concept of family coverage for specified periods of time.

Baltimore City Program

The persons covered by the Baltimore City medical care program initiated in 1948 are referred by the welfare department to the health department. Assignment for medical services, regardless of any stated need, is made by the health department to an appropriate medical care clinic. Cooperating with each of the six medical care clinics is a panel of physicians, one

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of whom is selected by a representative of the family. The family has free choice of physician and the physician retains the right to refuse to accept as patients any family. The manner in which services are rendered is shown in table 1.

Two points should be emphasized. The population covered is always known both in numbers and in detailed characteristics. The health department is primarily responsible for integrating the program; it has very little responsibility for providing services directly.

In view of the initial size of the program (population to be covered estimated at 21,000), it was decided to establish in the medical care section a statistical unit responsible for advising the medical care program. This unit receives technical assistance from the bureau of biostatistics and concerns itself with the accumulation of data required for evaluation and program analysis as well as with maintenance of the records system for disbursement of funds.

Benefits to patients and cost per service are two basic concepts fundamental to any assessment of a medical care plan. The success of such a plan can be measured by the extent to which it meets the essential medical needs of the population to be covered and by the amount and quality of services rendered per specified unit of money expended. Several procedures which

assist in the guidance of a program providing maximum patient benefit at minimum cost are described.

Indexes for Planning

A medical care program must be tailored to fit the population to be covered. In figure 1, the population of the United States, by age, is contrasted with the group covered by the Baltimore City medical care program and the enrolled members of the Health Insurance Plan of Greater New York (4). The indigent population of Baltimore has an extremely high proportion of persons at each end of the age scale, with a resultant low level in the middle-age categories. Compared with the general population, Baltimore has few persons in the young and middle-adult period. Note the opposite pattern in the age profile for the Health Insurance Plan, in which the adult ages predominate and persons in the older ages are few in contrast to the general population.

An examination of the age characteristics of the group covered by the Baltimore City medical care plan shows that the needs of a public assistance group are particularly associated with the problems of the aged, and in addition should provide an extensive preventive and pediatric service for the large numbers of children found in this group.

Analysis of the race and sex characteristics of the public assistance population (table 2) reveals a markedly different distribution than that of the community. Table 3 shows a definite excess of Negroes in the medical care group at most age levels, and significant concentration of females for the adult ages, suggesting a pattern of medical need associated with conditions commonly found among Negroes and among women.

A knowledge of the environmental and socioeconomic circumstances of the population to be covered by a medical care program furnishes useful information on the capabilities of the beneficiaries to assume responsibility for the care of ill members in the home or to benefit from health education efforts.

Figure 2 indicates the geographic characteristics of the covered population. White persons appear to be widely distributed throughout the city, with a small number of concentrated

Table 1. Agencies providing medical services and method of payment, Baltimore City medical care program

| Agency | Services provided | Method of payment |
|---|---|---|
| Private physician. | General care in the office or home; day and night. | Capitation: \$7 per person referred per year. |
| Medical care clinic. | General examination, diagnostic and special therapeutic services. | Capitation: \$10 per person referred per year. |
| Neighborhood druggist, hospital pharmacy. | Preparation of prescriptions as written by participating physicians. | Fee for service: based on wholesale cost of ingredients plus service fee. |
| Health department. | Clinical services: well-baby, prenatal, tuberculosis, venereal disease. | Free. |

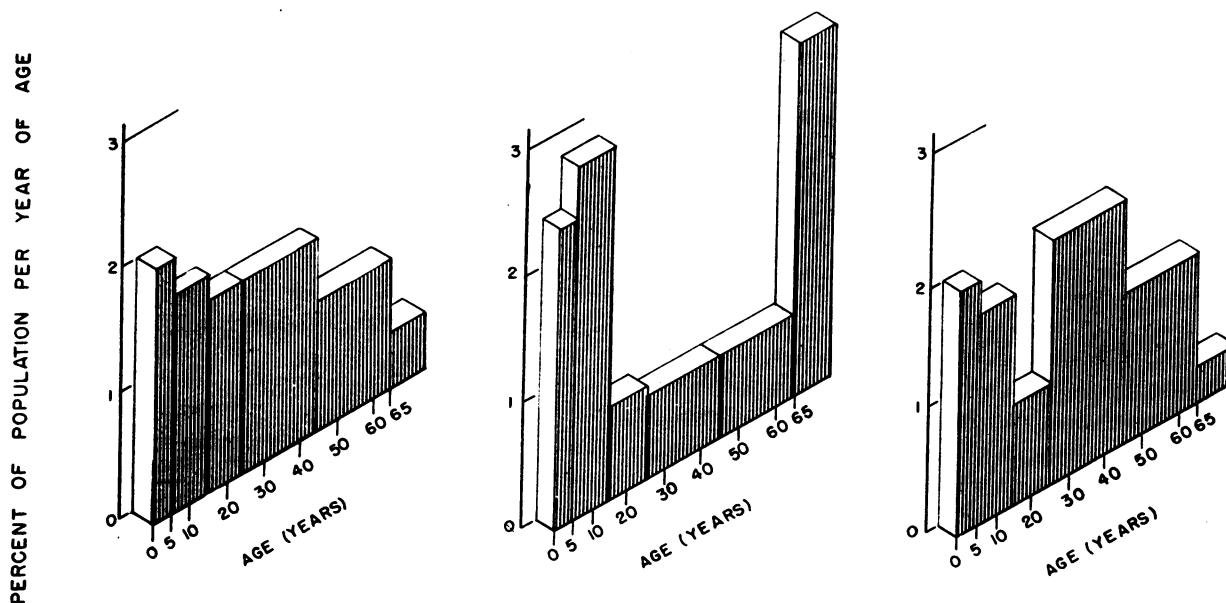


Figure 1. Distribution of selected populations, by age.

foci; the nonwhite medical care group is densely concentrated in the hub of the city.

Detailed housing statistics by census tract reveal the slum conditions in which the Negro group resides. Data on density of households indicate extreme crowding. With a few exceptions, the environmental circumstances of a considerable proportion of white covered families are more favorable than those of the Negro family units.

The limitation which the medical staff must expect in capabilities of patients for modification of the location or nutrition of the family is clearly demonstrated by the family budget. In 1950, according to an estimate of the Bureau of Labor Statistics (5), an elderly couple required an annual income of \$1,779 to maintain a modest standard of living. For elderly couples in the medical care program, who are dependent on welfare department grants, the current average income per couple from all sources is \$1,134, considerably less than that considered sufficient.

Estimation of Medical Needs

In developing the detailed organizational framework for administration of a service program, some estimate is necessary of the utiliza-

tion expected within a given pattern of providing care. Especially is this true for programs predicated largely on a capitation principle. Underestimates of utilization may cause hardship and dissatisfaction among the participating physicians. Excessive overestimate will result in a distribution of public funds which cannot be defended in budget reviews.

Several lines of attack on this problem were available at the initiation of the Baltimore City medical care program. The experience since 1948 both in health department programs and in such units as the Health Insurance Plan of Greater New York provides more recent information for planning purposes.

In considering an indigent urban population, it is well to recall that a principal source of medical service is the hospital out-patient department. A check of services to indigents during a prescribed period of time, when related to the known population of such persons, provides an estimate of utilization of clinical services as well as of their distribution by type.

Although 20 years old, the findings of the Committee on the Costs of Medical Care have great potential value as first approximations of expected volume of medical services in a com-

Table 2. Percentage distribution of population by race and sex, total Baltimore City and persons covered by Baltimore City medical care program

| Population | Total | White | | | Nonwhite | | |
|--|-------|-------|-------|--------|----------|-------|--------|
| | | Total | Male | Female | Total | Male | Female |
| Baltimore City (1950)----- | 100 | 76. 2 | 34. 3 | 41. 9 | 23. 8 | 10. 7 | 13. 1 |
| Baltimore City medical care program (1951) - | 100 | 26. 3 | 10. 4 | 15. 9 | 73. 7 | 29. 0 | 44. 7 |

prehensive program. In one of the committee's investigations, Falk, Klem, and Sinai (6) present information on services received during a 12-month period, according to family income. Utilization of the higher-income groups in this study represents a reasonable basis for expected utilization in a health department sponsored program. Baltimore has been fortunate in serving as an area for a 5-year study of causes of illness and utilization of medical services conducted during the period 1938-42 (7, 8). This type of investigation provides data of inestimable value and accuracy. Care must be taken in applying such material to populations with unusual distributions in respect to age and race; but with appropriate correction, observations made from such surveys furnish another

source of information upon which an estimate of utilization may be based.

Survey of Medical Resources

In formulating the initial medical care plan, it is necessary to determine whether the medical facilities are sufficient in number and properly disposed to meet the objectives of the program.

The blueprint for the Baltimore City medical care program places in the hands of the general practitioner the means to provide basic medical care for all covered families. One of the first tasks, therefore, was to determine the distribution of physicians in general practice with respect to location and number.

Analysis of the physician-per-population ratio in the white component of the community

Table 3. Persons covered, according to age, race, and sex, Baltimore City medical care program, July 1951

| Age group | Total | | | White | | | Nonwhite | | |
|------------------|---------|--------|---------|--------|--------|--------|----------|--------|---------|
| | Total | Male | Female | Total | Male | Female | Total | Male | Female |
| Number | | | | | | | | | |
| All ages----- | 22, 744 | 8, 967 | 13, 777 | 5, 974 | 2, 370 | 3, 604 | 16, 770 | 6, 597 | 10, 173 |
| 0-4----- | 2, 692 | 1, 396 | 1, 296 | 411 | 213 | 198 | 2, 281 | 1, 183 | 1, 098 |
| 5-14----- | 6, 334 | 3, 185 | 3, 149 | 1, 147 | 562 | 585 | 5, 187 | 2, 623 | 2, 564 |
| 15-24----- | 1, 841 | 606 | 1, 235 | 263 | 100 | 163 | 1, 578 | 506 | 1, 072 |
| 25-44----- | 3, 241 | 486 | 2, 755 | 665 | 160 | 505 | 2, 576 | 326 | 2, 250 |
| 45-64----- | 3, 184 | 1, 249 | 1, 935 | 905 | 411 | 494 | 2, 279 | 838 | 1, 441 |
| 65 and over----- | 5, 452 | 2, 045 | 3, 407 | 2, 583 | 924 | 1, 659 | 2, 869 | 1, 121 | 1, 748 |
| Percent | | | | | | | | | |
| All ages----- | 100. 0 | 39. 4 | 60. 6 | 100. 0 | 39. 7 | 60. 3 | 100. 0 | 39. 3 | 60. 7 |
| 0-4----- | 11. 8 | 6. 1 | 5. 7 | 6. 9 | 3. 6 | 3. 3 | 13. 6 | 7. 0 | 6. 6 |
| 5-14----- | 27. 9 | 14. 0 | 13. 9 | 19. 2 | 9. 4 | 9. 8 | 30. 9 | 15. 6 | 15. 3 |
| 15-24----- | 8. 1 | 2. 7 | 5. 4 | 4. 4 | 1. 7 | 2. 7 | 9. 4 | 3. 0 | 6. 4 |
| 25-44----- | 14. 2 | 2. 1 | 12. 1 | 11. 1 | 2. 7 | 8. 4 | 15. 4 | 2. 0 | 13. 0 |
| 45-64----- | 14. 0 | 5. 5 | 8. 5 | 15. 2 | 6. 9 | 8. 3 | 13. 6 | 5. 0 | 8. 6 |
| 65 and over----- | 24. 0 | 9. 0 | 15. 0 | 43. 2 | 15. 4 | 27. 8 | 17. 1 | 6. 7 | 10. 4 |

(table 4), as well as the geographic distribution of white practitioners, suggested no particular problem. The prevailing pattern of home and office care is such that white physicians provide care to white families and Negro physicians provide ambulant services to nonwhite families. A large proportion of indigent families received the equivalent of home and office care in the hospital out-patient departments prior to the establishment of the Baltimore City medical care program.

The story was vastly different for the non-white group. Not only was there an unfavorable ratio of physicians to population served, but the geographic distribution suggested that great difficulty would be experienced in finding personal Negro physicians for the families to be covered by the program. As a result of this analysis, attempts were made to attract new physicians into areas where a large-scale need existed.

Similar studies established the adequacy of clinical facilities in general hospitals and of neighborhood pharmacies, so that no unusual problems ensued in obtaining services of these agencies.

Indexes for Program Control

Progressive medical care administration must be based on a thorough understanding of the specific disease entities which a group presents. Information available from selected studies of out-patient records, morbidity studies, and discussions with physicians familiar with a given population segment provides a working basis for initial planning. However, as soon as possible, accurate and complete data on the conditions presented by a covered population should be obtained.

The Baltimore City medical care program provides for a general examination by one of the medical care clinics for every person referred to it. The results of this thorough medical survey yield invaluable statistics concerning the amount, classification, and severity of medical problems presented by an indigent population. A summary of this type of data is shown in table 5. However, some qualification is necessary. The persons included in this summary represent an unbiased sample of adults who have completed examinations at one of the participating medical care clinics. Although

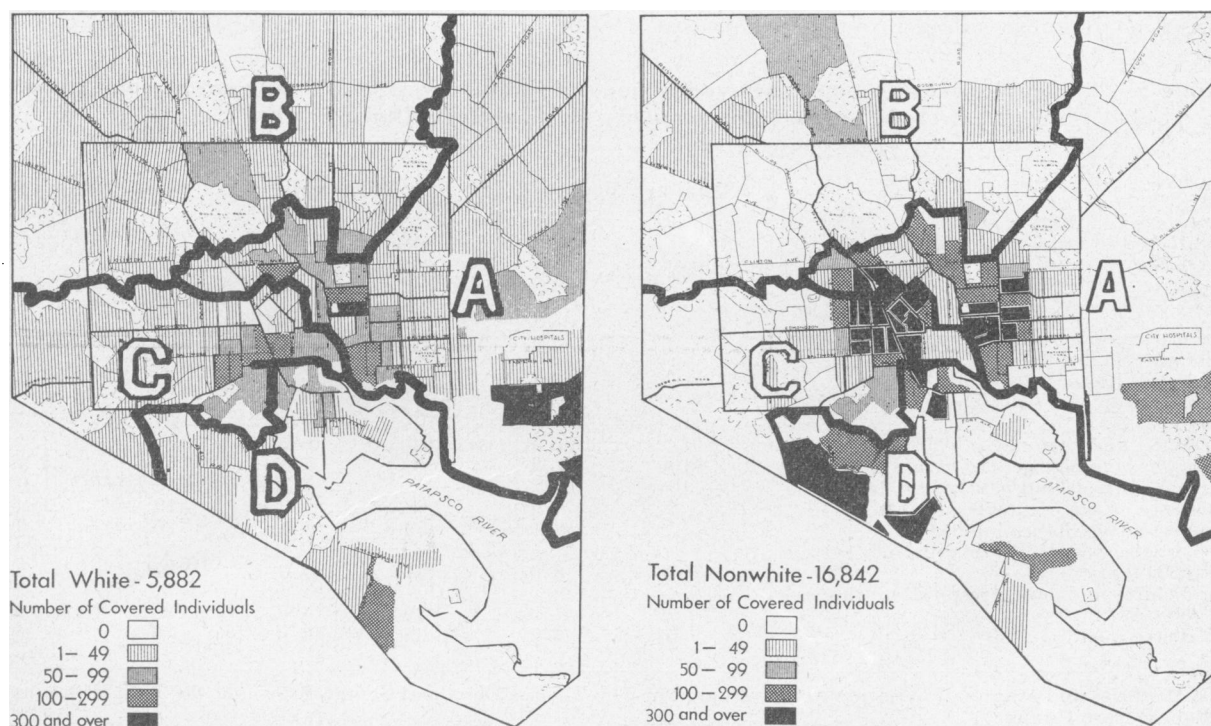


Figure 2. Population covered, by race and census tract, Baltimore City medical care program, 1951.

Table 4. Distribution of population and general practitioners, by race, Baltimore City, 1948

| | Total | White | Non-white |
|--------------------------------------|----------|----------|-----------|
| Total population..... | 943, 000 | 729, 000 | 214, 000 |
| General practitioners..... | 1, 120 | 1, 040 | 80 |
| Physicians per 1,000 population..... | 1. 19 | 1. 43 | . 37 |
| Population per physician..... | 842 | 701 | 2, 675 |

all persons registered at the clinic are scheduled for examination, approximately 12 percent fail to avail themselves of this privilege. In presenting the information available from the clinic histories selected, use has been made of the Sixth Revision of the International Lists of Diseases and Causes of Death, adopted in 1948, and a modification of the classification recommended for morbidity purposes has been employed.

The data in table 5 reveal a striking amount of disease diagnosed. (The high place of venereal diseases and diseases of the female genital organs would seem most unusual were it not consistent with early conclusions, drawn on the basis of population analysis.) However, the health administrator needs more information than the diagnosis alone provides. To assist

him in interpreting the data, the examining physician should supply, in addition to his diagnosis, information as to what limitation the patient's condition will impose upon his daily capabilities to perform useful work.

When the data in table 5 are further classified as to whether the diseases are disabling or not, they may serve as a basis for estimating requirements for specialists' and laboratory services. Any program for postgraduate instruction should seek to assist cooperating physicians in effective management of the more prevalent disabling conditions.

The study of clinical histories of the individuals included in this investigation showed that 850 or 87 percent of the persons examined had previous hospital or out-patient records, many of which were extensive in detail. Such records are believed to be characteristic of urban indigent groups and suggest that there should be some compromise with the concept of a complete physical examination for each individual in a medical care program.

Patterns of Utilization

In developing capitation fees, utilization rates were estimated from national as well as local surveys. In view of the unique distribution of care in the Baltimore City medical care

Table 5. Principal disease groups observed in general examinations of 975 indigent persons, aged 15-64 years, Johns Hopkins Medical Care Clinic, 1950¹

| Disease groups ² (listed in order of total prevalence) | Total prevalence | | Previously diagnosed | | Newly diagnosed | |
|--|------------------|------------------|----------------------|------------------|-----------------|------------------|
| | Number | Per 100 examined | Number | Per 100 examined | Number | Per 100 examined |
| Arteriosclerotic and degenerative heart disease (420-422)..... | 254 | 26. 1 | 187 | 19. 2 | 67 | 6. 9 |
| Venereal diseases (020-035)..... | 184 | 18. 9 | 163 | 16. 7 | 21 | 2. 2 |
| Diseases of digestive system (530-559) (571-587)..... | 134 | 13. 7 | 60 | 6. 1 | 74 | 7. 6 |
| Arthritis and rheumatism (720-727)..... | 112 | 11. 5 | 80 | 8. 2 | 32 | 3. 3 |
| Diseases of female genital organs (620-637)..... | 109 | 11. 2 | 56 | 5. 8 | 53 | 5. 4 |
| Psychoneurosis and psychosis (300-326)..... | 104 | 10. 7 | 94 | 9. 7 | 10 | 1. 0 |
| Diseases of the eye (370-379)..... | 87 | 8. 9 | 68 | 7. 0 | 19 | 1. 9 |
| Hypertensive disease (440-447)..... | 79 | 8. 1 | 59 | 6. 1 | 20 | 2. 0 |
| Other diseases of the circulatory system (450-468)..... | 78 | 8. 0 | 41 | 4. 2 | 37 | 3. 8 |
| Bronchitis and other respiratory diseases (500-527)..... | 77 | 7. 9 | 39 | 4. 0 | 38 | 3. 9 |
| Diabetes mellitus (260)..... | 51 | 5. 2 | 45 | 4. 6 | 6 | . 6 |

¹ Histories and examination results were evaluated by Drs. George Dana and George Brown, of the Johns Hopkins Medical Care Clinic.

² Figures in parentheses are International List numbers.

program, it has been necessary periodically to assess the extent to which facilities have been used by the covered population. In achieving this objective, it has been a standard procedure to develop suitable statistics from records which are essential for medical management or from an administrative point of view. Thus, clinic and drug utilization are determined by a study of the clinical histories and drug invoices for a systematic stratified sample of the covered population. Physician utilization studies are dependent upon the accuracy with which physicians check on a quarterly patient roster the number of visits made and have been somewhat difficult to accomplish because of the incompleteness of data provided. Nevertheless, the rough approximations which have been possible are administratively very worth while.

From the 1949-50 experience, utilization rates of benefits offered under the Baltimore City medical care program are shown in table 6.

By determining the amount of money which would be required to provide the services performed by the general practitioner if a fee for service were paid, it is possible to evaluate the correctness of the capitation fee. A similar mode of study is possible in regard to the clinic role in the program.

Age specific rates of utilization of services are often of great value in pointing out which segments of a covered population are the most costly elements. They assist also in planning extensions of the program to additional groups. An example of this type of data is shown in table 7.

Several other descriptions of utilization of services are worthy of mention, such as distribu-

Table 6. Utilization of services provided to eligible persons under the Baltimore City medical care program, fiscal year 1950

| Type of service | Number |
|---|--------|
| Physicians' visits per capita per year..... | 2.4 |
| Office..... | 1.5 |
| Home (day)..... | .7 |
| Home (night)..... | .2 |
| Clinic services per capita per year..... | 2.2 |
| Registration and screening examinations... | .25 |
| General examinations..... | .25 |
| Clinic services (diagnostic and special therapy)..... | 1.70 |
| Prescriptions per capita per year..... | 3.1 |

Table 7. Utilization of drugs, by age groups,¹ Baltimore City medical care program, fiscal year 1950

| Age | Number of persons | Number of prescriptions | Total cost | Annual per capita utilization | |
|------------------|-------------------|-------------------------|------------|-------------------------------|--------|
| | | | | Number of prescriptions | Cost |
| Total..... | 1,554 | 4,800 | \$7,084.06 | 3.1 | \$4.56 |
| 0-4..... | 90 | 89 | 100.80 | 1.0 | 1.12 |
| 5-19..... | 513 | 359 | 511.42 | .7 | 1.00 |
| 20-39..... | 180 | 460 | 667.25 | 2.5 | 3.71 |
| 40-59..... | 198 | 1,205 | 1,788.83 | 6.1 | 9.03 |
| 60 and over..... | 573 | 2,687 | 4,015.76 | 4.7 | 7.01 |

¹ Based upon a systematic stratified sample of persons assigned on July 1, 1949.

tion of persons by length of membership in the program and by number of services received.

Recent analysis of length of stay on the program indicates a 25-percent reduction in need for clinical services during the second year of registration, indicating in part the advisability of developing a stable program of care for any population group.

On occasion, a distribution of individuals according to number of services received has been most illuminating. Using such a classification, it may prove possible to encourage a thorough review of a small number of persons who are receiving a markedly disproportionate share of total services provided in a given time period.

Failure to Use Services

In assessing the manner of utilizing program benefits a group which fails to respond by initial registration or to appear for general examination constitutes a problem which requires study. The administrator is not trying to create unnecessary activity. Rather he desires to introduce the concept of early care and prevention to a group of families who may not appreciate the value of preventive measures.

During the early operation of the Baltimore City medical care program, it was found that approximately 40 percent of the families failed to respond to notification to register at one of the medical care clinics. Analysis of the age, sex, and race characteristics of this group did

not indicate any striking difference from the equivalent statistics for the total of persons assigned. It was decided, therefore, to conduct a systematic inquiry of the response pattern of a block of families assigned to one of the clinics. The results of this investigation are shown in table 8.

As a result of this investigation, and after a careful study of the reasons for nonresponse noted by public health nurses, who were used on a trial study basis, a successful pattern of contacting families has been evolved, eliminating the nonregistrant group as a significant segment of the medical care population.

Variability in Utilization Patterns

In any medical care program, a range of patterns will develop, in addition to some average tendency. One of the most useful techniques in the application of statistics to operation analysis is the description of variability in utilization patterns in a manner which permits a value judgment and leads to an administrative decision.

Some of the practices which have been critically analyzed and which should be of interest to any administrator are:

1. Prescription-per-visit ratio according to physician.
2. Physician referrals for consultation per 100 person-years' coverage.
3. Percentage distribution of prescriptions classified proprietary or nonproprietary.

Table 8. Registration pattern of a block of assigned persons, according to notification procedure, Sinai Medical Care Clinic, 1949

| Notification procedure | Total persons notified | Number registered | Registration per 100 persons notified | Cumulative percent registered |
|--|------------------------|-------------------|---------------------------------------|-------------------------------|
| Introductory card including appointment..... | 879 | 537 | 61.1 | 61.1 |
| Follow-up form letter including appointment..... | 468 | 153 | 32.7 | 78.5 |
| Nurse's visit..... | 106 | 76 | 71.7 | 87.2 |

Determination of Tolerance Limits

If C =Total annual prescription cost

c =Cost of a single prescription

N =Total annual number of prescriptions

n =Annual number of prescriptions filled in a single pharmacy

Then $\mu = C/N$ and $\sigma = \sqrt{\frac{\sum c^2}{N} - \mu^2}$

and $\mu \pm 3\sigma/\sqrt{n}$ =Limits within which the mean prescription cost of an individual pharmacy with an experience of size n may be expected to vary by chance from the mean, based on the total experience.

4. Error rate in billing, according to pharmacist.

5. Mean cost of prescriptions, according to pharmacist.

No doubt there will be other indexes which will warrant study, depending upon the organization of the program for providing services. It is beyond the scope of this paper to demonstrate the techniques of using each of these indexes to point out patterns of possible injudicious use of the program's benefits. It will be of interest, however, to show how the analyses of data on two of these items contribute to reductions in the cost of administration.

Because the cost of drug service constitutes approximately 25 percent of total expenditures in the Baltimore medical care program, and because it was suggested that use of nonproprietary preparations whenever possible could result in significant savings, an analysis was undertaken of a systematic sample of prescriptions processed in the fiscal year 1951.

The proportion in each drug classification which proprietary drugs bear to the total varied within wide limits, representing over all 55.4 percent of the total prescription experience. The proprietary drugs were then submitted to a physician-pharmacist team who, with the guidance of a statistician, classified the prescriptions with reference to an official alternative and indicated the approximate saving in

cost. The results of this evaluation are shown in table 9 and indicate that \$16.30 per 100 proprietary drug prescriptions would have been saved if complete use had been made of the United States Pharmacopeia (10) preparations. When considered in terms of the total drug experience, this saving is equivalent to a 6-percent reduction, or \$9,000, for the volume encountered in the fiscal year 1951, during which the drug bill of the Baltimore City medical care program was \$150,000.

Procedures Useful in Cost Control

Basic medical and drug services are provided by some 300 physicians and 500 pharmacists cooperating with the Baltimore City medical care program. The mean number of patient visits per 100 persons on a physician's list will vary with each physician. Reports by druggists will vary, among other things, in the average cost of prescriptions filled in their establishments.

To discover differences in practices of pharmacies within the drug program, variations in mean cost per prescription were studied, using the procedure shown in the accompanying box.

Pharmacies filling 100 or more prescriptions annually were regarded as unbiased samples of the total annual prescription experience having known mean and variance. Individual pharmacy differences from the total mean were evaluated in terms of the tolerance limits established.

A detailed study was made of invoices submitted by pharmacies with mean prescription costs lying outside of expected limits. In a few cases, the differences appeared to stem from an unusual character of the sample. In some instances, however, this technique proves useful in uncovering consistent deviations from standard cost practices. Such deviations can be obtained in either direction and are of equal interest so far as cost analysis is concerned.

Determination of Quality of Medical Care

In assessing the quality of a medical care program, it is necessary first to seek a definition of the characteristic to be measured. A definition which provides for no possible method by which the attribute "quality" can be quantitatively fixed will lead into a blind alley. How-

Table 9. Distribution of proprietary drugs by number and by cost status of equivalent United States Pharmacopeia preparation, Baltimore City medical care program, fiscal year 1951

| Drug group | Total number proprietary prescriptions | Status of U. S. P. equivalent | | | | Saving per 100 proprietary prescriptions |
|------------------------------------|--|-------------------------------|-------------------------------------|-------------|--------------------|---|
| | | Number not available | Number available | | | |
| | | | Number without cost saving | With saving | | |
| | | | | Number | Cost difference | |
| Total..... | 573 | 193 | 177 | 203 | \$93. 50 | \$16. 32 |
| Allergy preparations..... | 28 | 20 | 4 | 4 | 4. 60 | 16. 43 |
| Analgesics..... | 64 | 30 | 19 | 15 | 6. 65 | 10. 39 |
| Antibiotics and sulfonamides..... | 31 | 13 | 3 | 15 | 8. 70 | 28. 06 |
| Cardiovascular drugs..... | 80 | 20 | 38 | 22 | 12. 75 | 15. 94 |
| Dermatological preparations..... | 17 | 14 | 2 | 1 | 2. 00 | 11. 76 |
| Genitourinary preparations..... | 9 | 6 | 2 | 1 | . 30 | 3. 33 |
| Gastrointestinal preparations..... | 72 | 26 | 34 | 12 | 5. 25 | 7. 29 |
| Hematics..... | 17 | 2 | 5 | 10 | 9. 50 | 55. 89 |
| Hormones..... | 4 | 2 | 1 | 1 | . 30 | 7. 50 |
| Hypnotics and sedatives..... | 35 | 2 | 12 | 21 | 6. 75 | 19. 29 |
| Narcotics..... | 21 | 9 | 12 | | | |
| Respiratory preparations..... | 101 | 15 | 21 | 65 | 20. 85 | 20. 64 |
| Tonics and placeboes..... | 27 | 11 | 6 | 10 | 3. 45 | 12. 78 |
| Vitamins..... | 26 | 11 | 2 | 13 | 10. 55 | 40. 58 |
| Supplies and sickroom aids..... | 21 | 2 | 19 | | | |
| Other..... | 20 | 10 | 7 | 3 | 1. 85 | 9. 25 |

ever, in developing this new scale, broad measurement intervals will suffice until experience permits a finer scale. Necessary conditions are:

1. A standard based on total patient benefit.
2. Until such a standard is developed, a criterion based on program components. This criterion should include measureable attributes, such as performance of physicians, accuracy and completeness of medical care records, and accuracy of laboratory determinations.
3. The availability of resources is a limiting factor in performance and should be considered when interpreting quality measurement.

One attempt has been made to establish criteria which would allow for an evaluation of therapy employed in the Baltimore City medical care program insofar as data on drug prescriptions can provide information on this subject. By conference with an expert committee, a classification was devised which distributes prescriptions according to their therapeutic advisability. The principal considerations involved in establishing the classification were: (a) therapeutic, chemical, and pharmaceutical compatibility of ingredients; (b) rationale of treatment, considering the condition involved and the patient's age; and (c) availability of more effective drugs.

The results of this study are in process of analysis and will be reported later.

Conclusions

Statistical methods represent an efficient way to gather information and to make it useful for administrative decision.

The particular contribution of the statistician to problems of administrative analyses as these analyses concern determination of quality lies in the development of well-defined classifications of performance with previously assigned values.

Built into the program from the start was a statistical study unit. The work is going forward for approximately 3 percent of the city's population who receive public assistance, with continued attention given to the guidance that may be derived from statistical analyses. The administration considers such "chart and compass" facilities to be indispensable.

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